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under tier, the whole being immersed in a trough, or bath of soap and water; and the upper rollers have the alternating motion already adverted to, as they first revolve—say an inch, and then retrograde half an inch, and so on.

The felt having been thus well pressed, and further advanced towards completion, may be said to be in a state comparable with that of woollen cloth made with threads by the loom in the ordinary way, and like it, it is carried to the fulling or felting mill in which, after having been subjected to beating for eight hours, it becomes a firm cloth, and is ready for dyeing or printing as may be required, and, when tenterd and pressed, is fit for the market. The felted cloth becomes reduced in the process to about two-thirds the size of the bale of wool, or from thirty-seven yards long by eighty inches wide, to twenty-seven yards long by fifty-four inches wide.

ON A SCREW-JOINT FOR WATER-PIPES, &c.

BY MR. A. M. PERKINS.

THE mode employed for joining wrought-iron gas-pipes is to cut a right-hand screw upon each extremity of every pipe, and to have corresponding sockets screwed at both ends with right-hand threads; so that a socket having been screwed on the first pipe, the overhanging part of the socket serves for the reception of the second pipe, and so on. But the pipes do not come into contact.

Mr. Perkins, in his apparatus for warming buildings by a circulation of warm water, employs a right-hand screw on the one end, and a left-hand screw on the other end, of every pipe, and uses sockets which are tapped with a right and left-hand thread at their opposite extremities.

Those ends of the pipe which are cut right-hand are left square, whereas, those ends cut left-hand are each formed as the frustrum of a cone, in other words, they have sharp or V formed edges. Therefore, when the differently formed extremities of two neighbouring pipes are held at rest by means of gas tongs, and the socket alone is turned round, the pipes simultaneously enter the socket, and ultimately forcibly meet, so that the sharp edge of the one pipe is indented into the flat surface of the adjoining. The joints thus produced have been found capable of sustaining every pressure to which they have been applied, and the pipes themselves endure, without bursting, an expansive force of 3000 lbs. on the square inch.

The same principle is applied to cast-iron pipes for water-mains, &c., the right and left-hand screws being cast on each pipe, and

the sockets are also cast in iron. In these cases a mill-board annular washer, soaked in oil, is placed between the flat ends of the two pipes, which are screwed together by the double nut as in the former case.

DESCRIPTION OF AN IMPROVED CHAIN FOR CABLES,
AND FOR MINING, AND OTHER PURPOSES.

THE novelty and improvement in Mr. Cutler's chain consist in having, on one moiety of the links composing the chain, hollow cylindrical projections, called pummels, and, on the other portion of the chain, cylindrical cups or sockets, which, when put together, form a joint working upon its axis or fulcrum, such axis being the pin passing through the hollow part of the pummels and sockets, giving, at the same time, much greater strength and durability, with less bulky joints than heretofore.

In all former chains of this description, the strength of the chain depended on the pin running through cylindrical holes in the ends of the links; this pin may be called the joint-pin, and is introduced through the ends of the links in the exact centre, and such pin is secured in its place, either by a head at one end and a screwed nut at the other, or by a head at one end and riveted at the other, and by this means the several links forming the breadth of the chain are kept together. It is clear from this that, the strength depending alone on the pin, if such pin were to break, the chain must separate. The cylindrical projections in Mr. Cutler's chain fitting into the cylindrical cavities or sockets obviate this; for if the pin passing through them and forming the axis were to break, the bearing of the cylindrical projections or pummels in the cylindrical cavities or sockets would afford a sufficient support, the chain being held in that position by a pin passing through the middle portion of the link, consequently the chain would not separate, the pummels forming a sort of pin of much greater strength than the real pin; and the pummels, cups or sockets, being perfectly cylindrical, the tendency of its component parts to lateral separation is very little, and the chain being so constructed, it can accommodate itself to any sinuosities, however irregular, which may at any time be required, and, in fact, very much more than it is even probable or possible may ever occur, as the links will traverse through an area of 180° , and this is much greater than will be at any time required.

The strength of this chain was tested against a piece of the chain now in regular use for mines, and both of the same weight,